

## A beverage making device

The invention relates to a beverage making device comprising a brewing chamber for enclosing a pad containing a substance from which the beverage is to be brewed, which brewing chamber is formed by an upper part with one or more openings for supplying water to the brewing chamber, and by a lower part with an outflow opening through which

5 the brewed beverage can leave the brewing chamber, while beverage receiving means are present below said lower part. The expression 'pad' denotes any container holding a substance for brewing a beverage. It may be a disc-like container made of filtering paper enclosing the substance from which the beverage is to be brewed, but it may alternatively be any other container enclosing the required substance.

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WO-A-01/15582 discloses such a device comprising a water reservoir, means for heating the water to the required temperature, and means for pumping it to said holes in the upper part of the brewing chamber, so that the heated water can enter the brewing 15 chamber under pressure. The brewing chamber contains a pad, also called a pouch, made of filter material and containing a substance to be extracted, for example ground coffee. The heated water will pass through the pad, so that the coffee is extracted. During the extraction process, the brewed beverage (coffee) leaves the brewing chamber through an outflow opening located in the center of the lower wall of the brewing chamber and arrives in 20 beverage receiving means. The beverage receiving means comprise an outflow tube extending outside the device, so that the brewed beverage (coffee) can be caught by one or by two cups.

In the device, as disclosed in WO-A-01/15582, the portion of the device comprising the upper part of the brewing chamber can hinge upwards with respect to the 25 stationary part of the device including the lower part of the brewing chamber, in order to give access to the brewing chamber. The pad can thus be removed and/or a new pad can be provided for a next brewing process. In the upward position of the hinging portion of the device, the lower part of the brewing chamber can be removed from the device, and said beverage receiving means can also be removed from the device. The lower part of the

brewing chamber can be replaced by another similar part, which makes the brewing chamber larger, so that two pads can be placed in it, in order to brew enough beverage for two cups instead of one. The beverage receiving means can be removed in order to be cleaned, for example when a beverage other than the present one has to be brewed.

5 A beverage can be made in an extraction process by means of the device, for example to produce coffee, or in a dissolving process, for example to produce a chocolate drink. In the case of an extraction process, the extracted substance will remain in the pad, and the pad with the extracted substance must be removed from the brewing chamber after the brewing process. In the case of a dissolving process, the substance in the pad will disappear  
10 during the brewing process, and the empty pad must be removed. The pad may contain a rigid or an elastic internal framework to maintain the outside dimensions of the pad during the dissolving process.

It may be desired for various reasons to operate the device without a pad in the brewing chamber, in which case the heated water, supplied through said openings, is guided  
15 to the beverage receiving means without passing through a pad. The purpose of this operation may be, for example, cleaning of the device. It is also possible to make use of such an operation in order to brew a beverage by dissolving a substance which is present in the beverage receiving means. In general, more turbulence can be created in the beverage receiving means than in the brewing chamber, so that a better dissolving process can be  
20 achieved in the beverage receiving means. If, for example, a chocolate drink has to be brewed, the chocolate powder for the brewing process can be put in the beverage receiving means.

From time to time it is necessary to clean the different parts of the beverage making machine. Especially the brewing chamber and the beverage receiving means must be  
25 cleaned. Such means may comprise means for generating foam (froth) in that the beverage is injected into a frothing chamber, i.e. a beverage receiving chamber having a wall to which the jet of beverage is directed. The beverage is splashed in all directions in such a chamber, so that all walls will be contaminated.

To perform a cleaning operation, the lower part of the brewing chamber as  
30 well as the beverage receiving means can be removed from the device, for example, to rinse them under a water tap, or to wash them in a dishwasher. That is an effective way of cleaning in which all surfaces of the parts can be rinsed or washed. It is also possible to clean the device by simply initiating a brewing operation while the pad is not present in the brewing

chamber. However, there is only a limited rinsing effect when such a cleaning operation is performed.

5 An object of the invention is to improve the effect of the cleaning operation of the beverage making device, during which the parts to be cleaned remain in the device.

An alternative object of the invention is to improve the dissolving process during brewing of a beverage by means of the beverage making device.

To accomplish this objective, one or more further openings are present  
10 between the brewing chamber and the beverage receiving means, and means are present for closing said one or more further openings during the brewing process. After the brewing process, a next process can be initiated in which no pad is present in the brewing chamber and said one or more further openings are open. As a result, the heated water will be pumped through the brewing chamber to the beverage receiving means, not only through the outflow opening, but also through the further openings. The heated water can thus be guided to all  
15 locations where contamination has taken place during the brewing process, resulting in an effective rinsing action. The waste water leaves the device in the same way as the brewed beverage, so that it can be caught in a cup or the like. If a dissolvable substance is present in the beverage receiving means, the turbulence caused by the simultaneous supply of water  
20 through more openings will improve the dissolving process.

The cleaning operation can be performed very easily at any moment between two brewing processes. If desired, the cleaning operation can be shorter or longer than the brewing process, because of the efficiency of it. Means may be present for performing the cleaning operation automatically after the brewing chamber has been closed without a pad  
25 inside.

In one preferred embodiment, said one or more further openings can be closed in that a portion of said lower part is pushed downward, said portion comprising at least a part of the lower wall of the brewing chamber, preferably the central part of the lower wall of the brewing chamber. Spring means may be present for counteracting said downward  
30 movement, i.e. for pushing said portion back in upward direction.

In one preferred embodiment, said portion of the lower part is pushed downward by the pad that is present in the brewing chamber. To achieve such a pushing action of the pad, the pad may be pressed down by the fluid pressure in the brewing chamber. The pad creates a resistance for the liquid flow through the brewing chamber, resulting in an

increase in the fluid pressure above the pad. This pressure will push the pad downward, and therefore the pad will push said portion of said lower part downward.

Preferably, the pad is pushed in downward direction by the upper part of the brewing chamber when the chamber is closed. As a result, the pad can push against said 5 portion of the lower part with the same force, thereby closing said one or more further openings between the brewing chamber and the beverage receiving means. After the brewing chamber has been opened to remove the pad, the pad will be lifted by said spring means, so that its removal is facilitated.

Preferably, said further openings are formed as nozzles for creating liquid jets 10 in a direction inclined with respect to the vertical direction. Such nozzles can direct the heated water to any location that has to be rinsed or can direct the heated water to special areas to increase the turbulence of the liquid.

In one preferred embodiment, the device comprises means for increasing the supply of heated water to the brewing chamber to a higher level than required during brewing 15 of a beverage by means of a pad in the brewing chamber. The pressure as well as the flow is temporarily increased in this case, in particular through an increase in the power of the water pump. The increased water supply results in an improved rinsing effect and more turbulence in the beverage receiving means.

In one preferred embodiment, said lower part comprises an additional chamber 20 located underneath the brewing chamber such that said further openings connect said additional chamber with said beverage receiving means, and the connection between the brewing chamber and said additional chamber can be closed during the brewing process. The central part of the lower wall of the brewing chamber can thus move in vertical direction, so that an annular opening between the brewing chamber and said additional chamber is present 25 around said central part in the upper position thereof, and said annular opening is closed in the lower position. This preferred design will be further elucidated when an example of an embodiment is described.

In one preferred embodiment, the beverage receiving means comprise a foam chamber, also called a frothing chamber, for creating foam (or froth) in the beverage, said 30 further openings being formed as nozzles for directing liquid jets to different parts of the wall of said foam chamber.

The invention also relates to a method of cleaning a beverage making device comprising a brewing chamber for enclosing a pad containing a substance from which the beverage is to be brewed, which brewing chamber is formed by an upper part with one or

more openings for supplying water to the brewing chamber and by a lower part with an outflow opening through which the brewed beverage can leave the brewing chamber, while beverage receiving means are present below said lower part, one or more further openings are present between the brewing chamber and the beverage receiving means, and said one or

5 more further openings are closed during the brewing process and are opened during a cleaning process.

The invention also relates to a method of brewing a beverage by means of a beverage making device comprising a brewing chamber for enclosing a pad containing a substance from which a beverage can be brewed, which brewing chamber is formed by an

10 upper part with one or more openings for supplying water to the brewing chamber and by a lower part with an outflow opening through which liquid can leave the brewing chamber, beverage receiving means being present below said lower part, while one or more further openings between the brewing chamber and the beverage receiving means are present, no pad is present in the brewing chamber, said one or more further openings are open, and a

15 substance soluble in water is present in said beverage receiving means in order to brew the beverage.

The invention will now be explained by means of a description of an

20 embodiment of a device for making coffee with reference to the drawing comprising five Figures, in which:

Fig. 1 is a front view of the coffee making device;

Fig. 2 is a sectional view along the line II-II in Fig. 1 with the hinging part in closed position;

25 Fig. 3 is a similar view as shown in Fig. 2;

Fig. 4 shows the lower part of the brewing chamber; and

Fig. 5 shows the same lower part without a pad.

30 The Figures are very schematic representations, showing only relevant portions of the device. The coffee making device according to the described embodiment comprises a stationary part 1 and a hinging part or lid 2. The stationary part 1 comprises the lower part 8 of the brewing chamber, i.e. the removable part that comprises the lower wall of the brewing chamber. The hinging part 2 includes the upper part of the brewing chamber

comprising the upper wall 4 of the brewing chamber. The stationary part 1 furthermore comprises a water container and means for heating the water and pumping a predetermined quantity of the heated water through the hinging part 2 to the five holes 5 in the upper wall 4 of the brewing chamber. Said water container and said means are not shown in the Figures.

5 Figure 1 is a front view of the device for making coffee, showing the stationary part 1 and the hinging part, or lid 2. The lid 2 is represented in the open position, i.e. the position in which the brewing chamber is accessible, for example for replacing the pad 6. The upper wall 4 of the brewing chamber is in a substantial vertical position then.

Figures 2 and 3 are sectional views of the uppermost portion of the device  
10 with the lid 2 in closed position. Lid 2 can hinge about horizontal axis 7 to move between the open position and the closed position. Figure 2 shows the device having a pad 6 in the brewing chamber, and Figure 3 shows the device without a pad 6.

The device furthermore comprises the lower part 8 of the brewing chamber, which lower part 8 is removable from the device. It carries a handle 9 to facilitate the  
15 removal. A second removable part 10 is located below said lower part 8, which part 10 comprises a beverage receiving chamber 11 and an outflow tube 3 extending outside the device.

Figures 4 and 5 are schematic sectional views of said lower part 8. In Figure 4, a pad 6 is present on said lower part 8 and Figure 5 shows the lower part 8 without the pad 6.  
20 The disc-like pad 6 is a container made of filtering paper enclosing the substance, in this example coffee, from which the beverage is to be brewed.

Lower part 8, shown in Figures 4 and 5, comprises a metal part 12 having a circular edge 13, which edge 13 can rest on a corresponding circular edge of the stationary part 1 of the device. A circular sealing ring 14 is attached to part 12. The sealing ring 14  
25 abuts against the upper wall 4 when the brewing chamber is closed (see Figures 2 and 3), so that the brewing chamber is closed at its circumferential edge.

As is shown in Figure 4, metal part 12 forms an annular part of the lower wall of the brewing chamber. The central part of the lower wall of the brewing chamber is formed by a synthetic resin element 15, comprising the outflow opening 16 for the brewed beverage.  
30 The upper side of the element 15 is provided with protrusions to support the pad 6, so that the brewed beverage can flow between the protrusions to the outflow opening 16. Element 15 can move in vertical direction with respect to the part 12.

Figure 4 shows the element 15 in the lower position, in which the circular edge 17 of element 15 rests on part 12 through a sealing ring 18. An annular additional chamber 19

underneath the brewing chamber is separated from the brewing chamber thereby. In that situation the brewed beverage can only leave the brewing chamber through outflow opening 16. Element 15 is pushed down into its lower position by the pad 6, which pad 6 is pushed down by the upper wall 4 of the brewing chamber, in the case in which the brewing chamber 5 is closed, as is shown in Figure 2.

When the brewing chamber is opened, screw spring 20 will push element 15 in upward direction, so that it reaches its upper position, as is shown in Figure 5. In that upper position the pad 6 can be easily removed because it is lifted somewhat. If a new pad is inserted in order to perform the next brewing process, the element 15 will be pushed down 10 again when the brewing chamber is closed. However, if the brewing chamber is closed without a pad in it, then the element 15 will not be pushed down, so that the edge 17 remains at a distance from the part 12, as is shown in Figure 5.

So, when a normal brewing process is initiated without a pad 6 in the brewing chamber, then the heated water will not only leave the brewing chamber through outflow 15 opening 16, as is indicated by arrow 21, but also through annular chamber 19 and through openings 22 in the metal part 12, as is indicated by arrows 23. Each opening 22 can be formed as a nozzle for spouting a jet of water against a surface to rinse that surface intensively. Said surface may be a part of a frothing chamber (foam chamber) located underneath the lower part 8 of the brewing chamber.

20 Outflow opening 16 may be provided with a flow restricting element 24. Such an element 24 may function as a nozzle to create a jet of the brewed beverage and spout it against a surface to generate foam, for example to make coffee with a foam layer on it. Furthermore, if there is no pad 6 in the brewing chamber and water is flowing through 25 openings 22, such a restricting element 24 can limit the flow through opening 16, so that more water will leave the brewing chamber through openings 22.

The embodiment as described above is merely an example of the beverage making device; a great many other embodiments are possible.